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CLAIMS

What is claimed is:

A mold apparatus for forming at least one metal bump for direct placement on bond pads on a secondary substrate, comprising:

- a substrate having a surface; at least one cavity formed in said surface of said substrate; and a non-stick protective layer applied to said at least one cavity.
- 2. The mold apparatus according to claim 1, wherein said non-stick protective layer is a silicon oxide layer.
 - 3. The mold apparatus according to claim 1, wherein said non-stick protective layer is a silicon nitride layer.
 - 4. The mold apparatus according to claim h wherein said non-stick protective layer prevents metal material from adhering to said at least one cavity.
 - 5. The mold apparatus according to claim 4, wherein said metal material is a solder paste comprising lead and nickel.
 - 6. The mold apparatus according to claim 1, wherein said at least one cavity has a depth in said surface of said substrate of about 28 micrometers.
 - 7. The mold apparatus according to claim 1, wherein said non-stick protective layer has a thickness ranging from about 200 Angstroms to 5 micrometers.
 - 8. The mold apparatus according to claim 1, wherein said at least one cavity has a trapezoidal shape.

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- 9. The mold apparatus according to claim 1, wherein said at least one cavity has a hemispherical shape.
- 10. The mold apparatus according to claim 1, wherein said at least one cavity

 has a rectangular shape.
 - 11. The mold apparatus according to claim 1, wherein said at least one cavity has a square shape.
- 10 12. The mold apparatus according to claim 1, further comprising: at least one heating strip located on another surface of said substrate.
 - 13. The mold apparatus according to claim 1, further comprising: a plurality of heating strips located on another surface of said substrate.
 - 14. The mold apparatus according to claim 12, further comprising: an electrical conductor connected to a portion of the at least one heating strip.
 - 15. The mold apparatus according to claim 13, further comprising: an electrical conductor connected to a portion of the plurality of heating strips.
 - 16. The mold apparatus according to claim 1, wherein said substrate comprises semiconductor material.
- 25 17. The mold apparatus according to claim 1, wherein said substrate comprises ceramic material.

A solder mold apparatus for forming at least one metal bump for direct placement on a corresponding bond pad on a secondary substrate, comprising:



alsubstrate having a surface;

at least one cavity formed in said surface of said substrate; a non-stick protective layer applied to said at least one cavity; and a metal paste applicator.



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- 19. The solder mold apparatus according to claim 18, wherein said non-stick protective layer is a silicon oxide layer.
- 20. The solder mold apparatus according to claim 18, wherein said non-stick protective layer is a silicon nitride layer.
 - 21. The solder mold apparatus according to claim 18, wherein said non-stick protective layer prevents metal material from adhering to said at least one cavity.
 - 22. The solder mold apparatus according to claim 21, wherein said metal material is a solder paste comprising lead and nickel.
 - 23. The solder mold apparatus according to claim 22, further comprising a metal paste dispenser, coupled to said metal paste applicator, to place a metal paste on said substrate.
 - 24. The solder mold apparatus according to claim 23, further comprising a heating element to melt said metal paste to form a contact for application to said secondary substrate.

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25. The solder mold apparatus according to claim 18, wherein said at least one cavity has a depth in said surface of said substrate of about 28 micrometers.

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26. The solder mold apparatus according to claim 18, wherein said non-stick protective layer has a thickness ranging from 200 Angstroms to 5 micrometers.

- The solder mold apparatus according to claim 18, wherein said substrate comprises semiconductor material.
 - 28. The solder mold apparatus according to claim 18, wherein said substrate comprises a ceramic material.

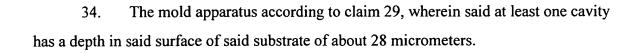
10 A mold apparatus for forming at least one metal bump for direct placement on bond pads on a secondary substrate, comprising:

a substrate having a surface;

at least one cavity formed in said surface of said substrate, said at least one cavity having a selected width and a selected length in said surface; and a non-stick protective layer applied to said at least one cavity.

- 30. The mold apparatus according to claim 29, wherein said non-stick protective layer is a silicon oxide layer.
- 31. The mold apparatus according to claim 29, wherein said non-stick protective layer is a silicon nitride layer.
- 32. The mold apparatus according to claim 29, wherein said non-stick protective layer prevents metal material from adhering to said at least one cavity.
- 33. The mold apparatus according to claim 32, wherein said metal material is a solder paste comprising lead and nickel.

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The mold apparatus according to claim 29, wherein said non-stick protective layer has a thickness ranging from about 200 Angstroms to 5 micrometers.

- 36. The mold apparatus according to claim 29, wherein said selected width and said selected length are substantially the same.
- The mold apparatus according to claim 29, wherein said selected width is smaller than said selected length.
 - 38. The mold apparatus according to claim 29, wherein said at least one metal bump has substantially the same dimensions as said at least one cavity.
 - 39. The mold apparatus according to claim 29, further comprising: at least one heating strip located on another surface of said substrate.
 - 40. The mold apparatus according to claim 29, further comprising: a plurality of heating strips located on another surface of said substrate.
 - 41. The mold apparatus according to claim 29, wherein said substrate comprises semiconductor material.